PUBLIC DOCUMENT . . . . . No. 76.

REPORT

OF THE

COMMISSION

ON

INDUSTRIAL EDUCATION.

SUBMITTED IN ACCORDANCE WITH RESOLVE APPROVED JUNE 21, 1906.

MARCH, 1907.

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Approved by

The State Board of Publication.

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MEMBERS OF THE COMMISSION.

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CHARLES H. WINSLOW.

CARLTON D. RICHARDSON.

MARY MORTON KEHEW.

CHARLES H. MORSE, *Secretary.*

Commonwealth of Massachusetts.

Report of the Commission on Industrial Education.

To the Honorable the Senate and the House of Representatives.

The commission appointed June 7, 1905, to investigate the subject of industrial and technical education, recommended that a commission be appointed to establish schools in co-operation with the local authorities throughout the State. A bill embodying their recommendation, with some modifications, was passed by the Legislature, and became a law Jan. 24, 1906. The members of the new commission were appointed by Governor Guild Aug. 31, 1906, and its first meeting was held on Sept. 28, 1906. The act creating the commission reads as follows: —

Acts of 1906, Chapter 505.

An Act to establish the Commission on Industrial Education.

Section 1. The governor, by and with the consent of the council shall appoint a commission of five persons, to be known as the Commission on Industrial Education, to serve for the term of three years, and to receive such compensation as the governor and council shall approve. The said commission on its organization shall appoint a secretary to be its executive officer, who shall not be a member of the commission, and who shall receive such salary as shall be approved by the governor and council, and the commission may employ supervisors, experts in industrial and technical education, and such clerical and other service as may be found necessary. The necessary expenses of the commission, including clerk hire, travelling expenses, stationery and all other incidental expenses, shall be paid out of the treasury of the Commonwealth, as may be provided by law, but shall not exceed the sum of eight thousand dollars for the remainder of the present fiscal year.

SECTION 2. The commission on industrial education shall be charged with the duty of extending the investigation of methods of industrial training and of local needs, and it shall advise and aid in the introduction of industrial education in the independent schools, as hereinafter provided; and it shall provide for lectures on the importance of industrial education and kindred subjects, and visit and report upon all special schools in which such education is carried on. It may initiate and superintend the establishment and maintenance of industrial schools for boys and girls in various centres of the Commonwealth, with the co-operation and consent of the municipality involved or the municipalities constituent of any district to be formed by the union of towns and cities as hereinafter provided. The commission shall have all necessary powers in the conduct and maintenance of industrial schools, and money appropriated by the state and municipality for their maintenance shall be expended under its direction.

SECTION 3. All cities and towns may provide independent industrial schools for instruction in the principles of agriculture and the domestic and mechanic arts, but attendance upon such schools of children under fourteen years of age shall not take the place of attendance upon public schools as required by law. In addition to these industrial schools, cities and towns may provide for evening courses for persons already employed in trades, and they may also provide, in the industrial schools and evening schools herein authorized, for the instruction in part-time classes of children between the ages of fourteen and eighteen years who may be employed during the remainder of the day, to the end that instruction in the principles and the practice of the arts may go on together: *provided,* that the independent schools authorized in this section shall be approved as to location, courses and methods of instruction by the commission on industrial education.

SECTION 4. Two or more cities or towns may unite as a district for the maintenance of the industrial schools provided for in the preceding section, but no such district shall be created without the approval of the commission on industrial education.

SECTION 5. Whenever any city or town or any district, as provided in the preceding section, shall appropriate money for the establishment and equipment and maintenance of independent schools for industrial training, the Commonwealth, in order to aid in the maintenance of such schools, shall pay annually from the treasury to such cities, towns, or districts a sum proportionate to the amount raised by local taxation and expended for the support of schools for each thousand dollars of valuation, as follows: cities and towns expending more than five dollars for each thousand of valuation for the support of public schools to be reimbursed by the Commonwealth to the amount of one half, those raising and expending between four and five dollars per thousand to the amount of one third, and those raising and

expending less than four dollars per thousand to the amount of one fifth, of the cost of maintaining industrial schools: *provided,* that no payment to any city or town shall be made except by special appropriation by the legislature.

SECTION 6. The commission on industrial education shall make a report annually to the legislature relative to the condition and progress of industrial education during the year, stating what industrial schools have been established and the appropriations necessary for their maintenance, in accordance with the preceding section, and making such recommendations as the commission on industrial education may deem advisable; and especially shall the commission consider and report at an early day upon the advisability of establishing one or more technical schools or industrial colleges, providing for a three or four years' course for extended training in the working principles of the larger industries of the Commonwealth.

SECTION 7. The trustees of the Massachusetts Agricultural College are hereby authorized to establish a normal department for the purpose of giving instruction in the elements of agriculture to persons desiring to teach such elements in the public schools, as provided in sections three and four: *provided,* that the cost of such department shall not exceed the sum of five thousand dollars in any one year, and that at least fifteen candidates present themselves for such instruction.

SECTION 8. Section ten of chapter forty-two of the Revised Laws, and all acts and parts of acts inconsistent with this act, are hereby repealed. [*Approved June 21, 1906.*

The commission herewith submits its first annual report, showing the results thus far of its own deliberations and of investigations of industrial conditions throughout the State. The report also shows that several cities and towns are cooperating with the commission in taking steps toward the establishment of industrial schools.

As the report indicates, the commission has pushed forward its work actively from the date of its first meeting, but the time has been too short to enable it to show more than the beginnings of its endeavor to deal with the large and complicated problems which it has to solve, and the initial steps taken toward the actual establishment of industrial schools. The commission believes, however, that the various statements submitted herewith will sufficiently indicate the breadth and importance of the program upon which the commission feels that an encouraging beginning has been made.

Secretary of the Commission.

Immediately upon its organization the commission took up the question of the appointment of a secretary, according to the terms of the statute. The law indicates clearly that the secretary shall be the executive officer of the commission. As such, it seemed to the members of the commission unquestionable that, in order to meet the great responsibility involved in such practical leadership, a man of the highest character and the best and most varied special attainments would be indispensable to the success of the work in hand. It was equally clear that it would be practically impossible to decide upon and secure at once a man of these qualifications.

The commission, therefore, prepared a letter stating the nature of the responsibility to be carried by the secretary, and indicating the type of man required for the position. This letter was sent to a large number of properly informed and influential persons throughout the country, and, in reply, the names and detailed recommendations of sixty-seven men were submitted to the commission. The letter was as follows: —

Commonwealth of Massachusetts,
Commission on Industrial Education, Boston, Oct. 2, 1906.

My Dear Sir: — The State Commission on Industrial Education, recently appointed by the Governor and Council of Massachusetts, is seeking a secretary who is to be its executive officer and expert adviser, and we earnestly seek your assistance in finding the right man.

It goes without saying that the secretary of the commission must possess good personal qualities. He must also have had a technical training in a technical school of high grade, must have had successful experience in at least one important industry, must have a decided interest in industrial education, and, if possible, must have had some educational experience.

He must be able to take the initiative in investigations and in the directing of investigations into various industries of Massachusetts, with a view of determining the kind or kinds of education that may be helpful to employers and employees; and when the commission takes the initiative he must be able to advise and co-operate as only a well-trained expert can.

He must be able to deal tactfully with all kinds of people and with organizations of employers and employees, and he must be able to present his conclusions on any subject clearly, forcibly and tactfully,

in public as well as in private. He must, therefore, be a good public speaker and an able writer.

We hope to find such a man in Massachusetts, but his present residence is a matter of much less importance than his qualifications. Naturally, we are looking for the man who possesses all of the qualifications we have enumerated, but we may have to be satisfied with a man who possesses most of them.

The commission can pay its secretary at the outset $3,000 per annum. We hope that during the three years for which the commission is appointed this salary can be increased, and we believe it can be increased if the right man is found. Can you help us find him?

The commission will be exceedingly grateful for any help you can give. Because of the urgency of this matter, I beg that you will reply at your earliest convenience.

By direction of the commission,

PAUL H. HANUS,
Chairman.

Meanwhile, the commission secured the services, as temporary secretary, of Mr. Robert A. Woods, head of the South End House, who has been actively interested in the legislative stages of the movement in the State in the direction of industrial education. In this way time was gained, in which the commission made a careful investigation of the desirability of all the candidates proposed. Mr. Wood's experience as an investigator into industrial conditions and as a constructive thinker on industrial education enabled him to render efficient service to the commission from the very start, and the commission is deeply indebted to him for his co-operation, both when he was temporary secretary and since.

It became unmistakable, after thoroughly canvassing the situation, that in order to secure a properly qualified secretary it would be necessary for the State to provide a salary of not less than from $4,000 to $5,000; and accordingly the approval of the Governor and Council was sought and secured for a range of salary as high as but not exceeding $5,000 per year.

The commission considers itself extremely fortunate to have secured for the secretaryship Mr. Charles H. Morse. Mr. Morse was born in 1860, and grew up on a New Hampshire farm, where he had experience with a great variety of agricultural work under thoroughly favorable conditions. He graduated at the Bridgewater, Mass., Normal School in 1881. He also de-

voted some time to a course of business training. After having been principal of grammar schools in different towns in Massachusetts, he became a member of the staff of the English High School in Cambridge, where he had charge of the academic department of the Rindge Manual Training School. Here he taught physics and electricity, and at intervals took private courses at the Institute of Technology. For ten years he took advantage of his time during vacations to work in various shops, and thus acquired a good command of the machinist's trade and of the cabinet-making trade. From 1891 until 1895 he was inspector of wires for the city of Cambridge, having charge of the fire alarm, police signal, telephone, lighting and electric power systems in use by the city, and exercising supervision of all wires, both above and under the ground, in use by private concerns.

In 1895 Mr. Morse was elected superintendent of the Rindge Manual Training School, Cambridge. He continued to devote some time to electrical engineering work, and, in addition to the extremely successful administration of this well-known technical high school during the past eleven years, Mr. Morse has been called as a mechanical and electrical expert in nearly two hundred cases in the courts of Massachusetts, New Hampshire and Rhode Island. He has done work as consulting engineer for the Boston & Maine Railroad, the Fitchburg & Leominster Street Railway, the Blue Hill Street Railway Company, the Old Colony Street Railway Company, the Boston & Northern Street Railway Company, the New York, New Haven & Hartford Railroad, and for various private individuals. For some years Mr. Morse has been one of the directors of the Massachusetts Charitable Mechanic Association Trade School, Huntington Avenue, Boston; and for the past two years he has been, without any cost to the city of Cambridge, principal of its evening school of trades, which is carried on in the Rindge building.

In assuming his duties as secretary of the commission Mr. Morse lays aside all other remunerative work of whatever description.

Conclusions of the Preliminary Commission.

The report of the preliminary commission for the investigation of the subject of industrial education made a profound impression upon educators and public-spirited citizens generally, not only in Massachusetts but throughout the country. The demand for this report was so large that a second edition was issued. As the initial documentary statement with regard to the movement for industrial education in Massachusetts, it has already had distinct influence in arousing similar movements in other States; for example, in New York and Rhode Island.

That report showed, as a result of public hearings, that there was: —

A strong general interest in industrial education among students of social phenomena and expert students of education, as furnishing a means of securing greater efficiency among wage earners.

A practical and specific interest among manufacturers and wage earners, now that the old apprenticeship system has almost entirely passed away, in the industrial school as a means of training in technical skill and "industrial intelligence."

A growing feeling of the inadequacy of the existing public school system, and a desire that the schools of the State should meet in a more practical way the exact needs of the great body of the children and youth of the State.

A general lack of definite ideas as to the proper scope or method of the desired industrial schools.

The inquiries of the commission indicated clearly that it was not entirely impracticable to develop a system of industrial education which would be free from the dangers which trades unions representatives pointed out.

The preliminary commission also felt it clear, from the result of inquiries made by it, that the whole burden of conducting such schools should not be laid upon the local cities and towns, but that the State should give substantial aid.

In general, the conclusions reached by the preliminary commission, as a result of its various inquiries, including an important special investigation into the problem of what becomes of the mass of boys and girls during the three or four years

after they leave the grammar school, may be said to mark an epoch in educational progress not only for Massachusetts but for the country as a whole.

Point of View of the Present Commission.

The present commission, as it is instructed to proceed toward the actual establishment of industrial schools, has directed its efforts almost entirely toward initiating, as soon as may be practicable, at different centers throughout the State, movements toward that result. The members of the commission feel strongly, however, that it is essential that the development of industrial education in Massachusetts should proceed in the full light of the facts with regard to industrial needs and social conditions, and the best results of experience to be collected in the organization and administration of industrial education throughout the United States and in Europe.

The present commission has entered on its duty without fixed notions as to the form which industrial education should take throughout the State, and is taking pains to develop such schemes of industrial education as precise local needs and conditions call for. Yet certain broad principles seem to the commission to be essential to the development of any sound system for equipping a higher type of new recruits for the industries of the State, and adequately educating the whole new generation for actual life. The present commission finds itself in substantial accord with the conclusions reached by the preliminary commission. But it has worked out for its own guidance, as a result of previous personal acquaintance with the subject from various points of view, as well as from the observations and discussions of the past six months, a provisional platform, as follows: —

The progressive development of all high-grade industries requires skilled workmen, possessing "industrial intelligence," — that is, comprehensive insight into and intelligent interest in their several trades, — as well as skill. The present conditions of production are usually unfavorable to the training of such workmen in the shop or factory, and sometimes render such training impossible. All industries, whatever their grade, need more men than are now obtainable, who are capable of acting as

foremen, superintendents or managers, — men possessing the comprehensive insight, interest and skill necessary for the organization and direction of a department or a shop. In general, such men, whether workers, foremen or superintendents, are now developed only by chance, and they are then self-made men, possessing the merits but also the shortcomings of their training.

Meanwhile boys (and girls) are not only not directed toward the trades in our existing schools, but are actually often directed away from them by the bookish education of those schools and their purely academic traditions. The public schools are doing their work to-day better than they have ever done it. This statement is made on evidence, and is not merely an opinion. But, both on account of the youth of the children up to the end of the grammar school period and because of the general education which those schools exist to supply, it is only natural that they should not have concerned themselves with the development of a vocational purpose, nor with the training which points toward the realization of that purpose. Up to the age of fourteen the whole of a pupil's time is required for the general education on which his vocational training should be based.

The high school pupils have entered on a longer career of general education, and in most cases look forward to a business career or to further study in some higher institution for a profession. The academic high schools, accordingly, even when they comprise so-called commercial courses or courses in manual training, are not vocational schools; they are schools for general education, and, like the elementary schools, are doing their work better than they have ever done it. They do not, however, aim to supply the specific education required for a particular calling.

In every democratic society the schools provided by the public should meet the needs of all classes, — those who are not going to college, as well as those who are. The existing public high schools serve to give a general education to those pupils whose training must cease on graduation, and at the same time they offer preparation for admission to college or some higher technical school. The manual training high schools — or so-called technical high schools — were intended originally to train recruits for the trades, but they have not done so. They are

institutions for general education, like the academic high schools, but, unlike them, serve to give a certain class of pupils a general high school education with the help of manual training, or, like them, to prepare their pupils for higher training in some college or engineering school.

Boys are not wanted in most of the skilled industries until they are sixteen years of age. The total result is a great number of boys and girls from fourteen to sixteen years of age, most of whom are at work in various kinds of juvenile occupations, in which they learn no trade, are subject to little if any beneficial general education, and often to much harmful education from shifting experience and environment. Large numbers of these children would be in school if the school promised preparation for some life pursuit. These years are of little economic value to such children, and there is little increase in the economic value of most of them as time goes on. Hence, these are at present wasted years, — lost to the children because of a lack of economic growth, and to the industries because the children are not fitted to satisfy the demand for trained workers by the time they are old enough to be employed in the trades.

These years and the subsequent years are, however, valuable for industrial education; but there is at present no agency whereby this education is provided, save here and there to a limited extent only, and then chiefly by philanthropy.

Hence the need of industrial schools to supplement the existing school system, and to meet a new educational need which has developed with the evolution of our industries and commerce. Such schools would receive pupils fourteen or fifteen years of age who declare their intention to learn a trade; and would, therefore, be parallel to the existing public high schools, but independent of them.

Such schools must be established as independent schools, because the motive or end for which they exist, namely, *vocational training* as contrasted with *general training*, determines the value of the instruction in every detail. In order to keep such schools in close touch with the trades and with agriculture there should be local advisory boards, including representatives of the industries concerned, employers and employees.

The commission believes that such schools should offer four years of training, as described below, for pupils fourteen or fifteen years of age on admission; but it believes also that such schools will be developed gradually. Pupils who could take only a partial course in the proposed schools would be all the better apprentices because of their school training, however brief it might be.

When the schools are fully established, the commission believes the four years of instruction might be divided as follows: —

The first two years would cover general shop instruction, at least two hours per day, together with related mathematics, drawing, natural science and English.

The work of the last two years — which could be gradually completed during a longer period in the evenings, or on the part-time system, meaning part of the time in the factory or shop and part of the time in the school during working hours, whether on the same day, or at intervals of several days, or even weeks, by pupils who were obliged to go to work at sixteen — should give the shop instruction for particular trades, and for each trade represented the drawing, mathematics, mechanics, physical or biological science applicable to that trade; the history of that trade; civics treated as concretely as possible; and shop and business English.

The commission intends to provide for evening pupils; and it intends to make every effort to secure the co-operation of employers, to the end that part-time courses for apprentices may be established in the proposed schools.

A fuller exposition of the type of schools proposed by this commission will be found in Appendices A and B.

Although the statute confers no authority on the commission to work in co-operation with the existing public schools, yet, because of the obvious preparatory relation of general education to the vocational training of the independent schools which municipalities working with the commission may provide, the commission is ready, whenever desired, to co-operate, so far as it can, with State or local authorities in promoting mutually helpful relations between them and the independent schools authorized by the statute.

THE COMMISSION AND LOCAL INITIATIVE, — FURTHER CONFERENCES.

The general attitude of the commission in the development of its work and the conduct of the various conferences has been determined by the mandate expressed in the law which led to its appointment. The commission has striven to bring clearly and effectively before the representatives of many different interests throughout the State the vital importance to the people of the establishment of local industrial schools. It has undertaken to explain clearly the provisions of the statute and the willingness of the State to co-operate with the towns in this important matter. The commission has taken pains to draw out the views of all classes of citizens with regard to the proposition in general, and in particular with regard to the local facts which would affect helpfully or injuriously the development of the industrial schools.

The commission has offered all reasonable encouragement to cities and towns toward taking specific steps that would lead to local appropriations, and, therefore, to requests for State aid, as indicated in the statute.

With a view to securing a full expression of the public mind with reference to the establishing of industrial schools in the Commonwealth, the commission has held public meetings and informal conferences in several of the principal cities and mill towns of the State, in which the plans and purposes of the proposed schools have been discussed by men representing all the various interests of the community.

In addition to seventeen conferences, eight in Boston, three in Fitchburg and one each in Springfield, North Adams, Worcester, Pittsfield, North Attleborough and Attleborough, members of the commission, or its representatives, have spoken in Amherst, Attleborough, Boston, Chicopee, Deerfield, Fitchburg, Lawrence, Leominster, Newton, North Adams, Pittsfield, Springfield, Wellesley and Worcester.

The commission has held twenty-nine board meetings since its organization.

The nature of the result of these conferences and meetings confirms the commission in the belief that the people of the

State as a whole are ready to co-operate in substantial ways with the Legislature in the gradual experimental building up of a system of vocational training of the new generation which in a few years must begin to make up the industrial force of the Commonwealth.

The commission has also been gratified to find that the educators of the State are prepared to welcome additions to our facilities for adding concrete results to what is gained through the existing scheme of education. The fact that so many of our teachers realize the deficiency of the present scheme from the point of view of training for livelihood and vocation seems to the commission one of the most hopeful elements in the situation.

As to the attitude of the employees in our industries throughout the State, the commission feels that while on the one hand there is a feeling of doubt and even distrust in the minds of many of them with regard to some of the aspects of this movement, yet, as a result of efforts made by the commission to reach the workingman's point of view through full consultation, the members of the commission are unanimous in the belief that all that is vital and essential to a proper scheme of industrial education for Massachusetts can be and will be brought about not only without opposition on the part of organized labor, but in many cases with the active and interested co-operation of its representatives.

The commission intends to pursue its policy of holding conferences with groups of citizens and local organizations throughout the Commonwealth. Although many such conferences have been held, and many addresses have been made by individual members of the commission and its representatives, as indicated above, several important industrial centers of the State have not yet been visited by the commission or its representatives, because the time has been too short since the organization of the commission. Several important industries, also (including the shoe trade), have not yet been investigated by the commission, for the same reason. But the possibilities and the advantages of schools for training for all the important industries of the State [1] will be thoroughly canvassed as soon as possible.

[1] See Appendix E.

Schools of Agriculture.

The commission has endeavored to ascertain the needs and desires of the rural sections of the State on industrial and agricultural education, and to this end meetings have been held as follows: on February 4, with the "Smith Fund" superintendents of Northampton; on February 8, Commissioner Richardson and Secretary Morse, by vote of the Board, visited the Agricultural College at Ithaca, N. Y., and held a day's conference with Prof. L. H. Bailey, a man well acquainted with the agricultural conditions of his own State, and well known as a lecturer throughout the country; on February 14, Commissioner Richardson and the secretary gave addresses on the subject of agricultural schools before the Pomona Grange of Wellesley

Addresses have been given at Deerfield by Commissioner Richardson on February 15; at Amherst, on March 7, by Dr. George M. Twitchell; and at Leominster, by Commissioner Richardson and the secretary, on March 20.

At these meetings the opinions expressed in the discussion of the subject were unanimously in favor of the establishment of the agricultural schools contemplated.

As a result of these investigations, and from facts supplied by Commissioner Richardson, who is thoroughly conversant with the agricultural interests of the Commonwealth, it is the opinion of the commission that there is a demand in various agricultural sections for schools which shall be devoted to specialized work, object lessons and such practical courses as have a direct bearing on farm life for both boys and girls.

Furthermore, it is the belief of the commission that agriculture must be developed in Massachusetts on a plan different from the one so successfully followed in our western States. Here our farming must be intensive, instead of extensive, as in the west. It is hoped that a typical agricultural school may be established before the next annual report.

Such a school would take the boy and girl at the age of fourteen. In addition to the work assigned the boy to be done on the farm, which would be under the control of the school, he would be given practice work, drawing and other studies particularly useful in farm management. The regular course

should be sufficiently extended to prepare pupils for admission to the State Agricultural College at Amherst, and winter courses should be provided for those whose services could not be spared from the farm in summer.

The practice work, including the shop work, should be such as would be most helpful to a farmer, such as would result in making a man skilful in the care and repair of farm machinery and buildings. Another line of work should certainly include botany, physiology and hygiene, applied physics, chemistry and mathematics, also surveying.

The year should be divided into three terms; and the following courses, as given in the Marathon County School of Agriculture and Domestic Economy of Wisconsin, could be modified to meet the requirements of our rural communities: —

COURSE OF STUDY FOR BOYS.

First Year.

First Term. — The soil, d. 5;[1] shop work, carpentry, d. 5; English, 5; business arithmetic, 5.

Second Term. — Soils and fertilizers, d. 5; shop work, carpentry, d. 5; English, 5; library reading, 5.

Third Term. — Plant life, d. 5; vegetable, flower and fruit gardening, d. 5; poultry, d. 5; English, 5; library reading, 2.

Second Year.

First Term. — Plant life, d. 5; shop work, blacksmithing, d. 5; United States history, 5; economics, d. 3; library reading, 5.

Second Term. — Animal husbandry, d. 5; rural architecture, d. 5; United States history and civil government, 5; library reading, 5.

Third Term. — Animal husbandry, d. 5; vegetable, flower and fruit gardening, d. 5; economics of agriculture, 5; library reading, 5.

COURSE OF STUDY FOR GIRLS.

First Year.

First Term. — Cooking and sewing, d. 5; domestic hygiene, 5; English, 5; business arithmetic, 5.

Second Term. — Cooking and sewing, d. 5; home economy, 5; English, 5; library reading, 5.

Third Term. — Cooking and sewing, d. 5; vegetable, flower and fruit gardening, d. 5; English, 5; library reading, 5.

[1] The numerals denote the number of recitation periods per week; d. denotes double period.

Second Year.

First Term. — Cooking and sewing, d. 5; laundry, d. 3; United States history, 5; library reading, 5.

Second Term. — Cooking and sewing, d. 5; chemistry of foods, 5; United States history and civil government, 5; library reading, 5.

Third Term. — Cooking and millinery, d. 3; home nursing, d. 2; poultry, d. 3; vegetable, flower and fruit gardening, d. 5; library reading, 5.

The commission also believes that courses in agriculture could profitably be given in some of the industrial schools that may be established in manufacturing towns.

Further Investigations.

The commission intends to acquaint itself with the nature and value of such technical study as is being followed by large numbers of young mechanics and artisans throughout the State, including, of course, the correspondence schools. It is proposed as soon as possible to have investigations made of the work of industrial schools, both in this country and abroad, taking into account not only the whole method and administration of the schools, but their influence and effect upon trade and commerce, and in particular upon the welfare of the whole industrial population.

Miss Susan M. Kingsbury, an investigator for the preliminary commission, is now at work classifying a large amount of material secured by the preliminary commission, which in consequence of lack of time had not previously been arranged. This material bears largely on the need of industrial education in particular cities.

Higher Industrial School.

The commission has had this problem in mind at all its conferences. It has held two special conferences on the subject, and others are being arranged. It is expected that a report will be made on this important question not later than Jan. 1, 1908.

Circulars of Information.

In order to keep the public informed of the progress of industrial education in this country and abroad, the commission is preparing to issue circulars of information from time to time. Two of these circulars are printed as appendices of this report (appendices C and D). The first of these gives a brief general account of the very successful industrial continuation schools of the city of Munich, in Germany (of which there are now *forty different kinds*); and the second gives a translation of the program of studies of one of those schools. The commission has in press the programs of several of the other schools of this sort, and they, as well as the one printed in Appendix D, will soon be ready for distribution.

The Situation in Different Cities.

Fitchburg.

The subject of industrial education in Fitchburg has been presented by the commission, or its agents, to manufacturers, merchants, trades unions and women's clubs. Several committees were appointed, as a result of these meetings, to co-operate in preparing a plan to be presented to the city government.

The present committee, composed of employers, employees, representatives of labor unions and business men, have requested an appropriation from the city government, with a view to establishing a day school for fifty boys and twenty-five girls.

The manufacturers agree to give preference to graduates of this school, and to reduce the first year's apprenticeship by six months.

Worcester.

Here the question has been presented to several local organizations by members of the commission and by the temporary and the permanent secretary, and has been thoroughly discussed by all interested parties. The Worcester Education Association has taken the lead, and the city government has been requested to appoint a committee to co-operate with this commission in the establishment of a school. The matter is now (March 14) before the city government for action.

Pittsfield.

The commission has attended one conference and one public meeting in Pittsfield. At the public meeting it was unanimously voted that a school should be established by the city. Here two new school buildings are proposed, and it is likely one of them may be used for an industrial school. A committee has been appointed, which now has the question in hand, and favorable results are expected.

North Attleborough and Attleborough.

Local initiative led to a conference with the commission in each of these towns. Conference committees have been appointed, with a view to the establishment of a school of jewelry and silverware design. Public sentiment is strongly in favor of an early beginning.

Lawrence.

An address has been given in Lawrence by a member of the commission before the central labor union, also one before the Board of Trade. These two organizations have appointed committees of conference, with a view to the establishment of a school at no distant date.

Northampton.

The city government of Northampton has by vote asked the co-operation of this commission, and has appointed a committee with power to represent the city in the establishment by this commission of an agricultural school.

North Adams.

The city government of North Adams has passed to its second reading an appropriation of $7,500 for the establishment of an evening industrial school. It is expected that the courses of study proposed by the citizens will be submitted to this commission at an early date.

In order to aid in the maintenance of the school now authorized by the city government of Northampton, and of other schools which may be authorized previous to the adjournment of the General Court, it will doubtless be necessary for this commission to ask for appropriations at an early date, as provided for by section 5 of chapter 505 of the Acts of 1906.

PAUL H. HANUS, *Chairman.*
A. LINCOLN FILENE.
CHARLES H. WINSLOW.
CARLTON D. RICHARDSON.
MARY MORTON KEHEW.

APPENDICES.

Appendix A.

Introductory Remarks by the Chairman of the Commission at a Conference with Labor Union Representatives, at Worcester, Jan. 12, 1907.[1]

I don't think any extended explanation of our errand here will be necessary. You all know that this commission is appointed for the purpose of promoting the establishment of schools for the training of men in industrial occupations; and we are here, therefore, to confer with you on such general plans as the commission already has. It goes without saying that both employers and employees have an equal interest in such an enterprise as this; and it is, of course, on that account that we arrange conferences with both parties. We shall be very glad, if questions are asked, to answer them as well as we can; and in order to set the matter before you I will outline a rather indefinite plan, talking about it as definitely as possible, which may serve as a basis for discussion, and possibly in the future for the actual development of schools.

You may be aware that the last commission found that there are at least twenty-five thousand boys and girls in Massachusetts, between the ages of fourteen and sixteen, who are now in various kinds of juvenile employments, or who are idle; and that these young people who enter the juvenile employments earn very little at the start, and increase their earning capacity but little as the years go on, so that by the time that they are eighteen, or nineteen, or twenty, they are able to earn little more than they had earned when they were much younger; and that at eighteen or nineteen a very large proportion of them have arrived at almost the maximum of their earning capacity. Now, the commission, of course, desires to prevent this waste, and is

[1] Reported stenographically.

especially desirous of securing for these young people a career in a trade which will insure them a steady job, and, if they are the right kind of workers, an increasing wage.

We therefore want to see what can be done for the boy who is about sixteen years of age and who is ready to begin the learning of a trade. If such a boy as that were to enter a school which showed him at once how to develop the capacity that he may have for a given trade, — one of the machinists' trades, or one of the building trades, or agriculture, or any calling to which he desires to devote himself, — such a school would help him to develop gradually the efficiency which the workman ought to have. Such a school would provide, of course, much instruction in shop work. It ought, however, to do a good deal more than simply to develop mechanical skill. A school which does only that is not the best kind of an industrial school. The school ought to help the man to see his trade in all its bearings, and ought to enable him to understand its theoretical foundations. Hence, besides the shop work, such a school ought to provide instruction in drawing, enabling the man to learn to read a working drawing, and also, of course, to make a working drawing. It ought also to provide instruction in mathematics, — the geometry, and algebra, and the arithmetic appropriate to his particular trade; so that the problems solved in the class room are the problems of the shop. Further, most of the trades, including agriculture, will require, also, instruction in physics and chemistry and other sciences, so that a man would know something about the origin of the materials that he uses, how these materials are prepared for the uses to which they are put, what their qualities are; and, in short, would have the sort of information which now a worker sometimes gets only after many years of experience and private study, and usually fails to get at all. Also, such a school ought to give some instruction in the history of the man's trade, so that he knows the part that the trade plays in the industries which are maintained, the part which it has played, its relations to other trades, and so on.

Now, in such a school as that it is clear that the workman would have not only acquired the mechanical processes and the incipient skill which every workman ought to develop, but it is clear that the man would get a kind of insight into his trade

altogether like that which a professional man gets into his calling.

Such a school naturally cannot make a finished workman, although it can teach a trade; much additional practice is needed to make the skilled journeyman. It can do for the workman, however, what the shop cannot do. You are well aware how highly specialized — most of you know that a great deal better than we do — modern industry is, and therefore how difficult it is for the man to learn in the shop all the processes of his trade; how, indeed, very often it is quite impossible. Such a school as we have in mind would naturally make good that deficiency. It would enable a man not only to learn a particular process or a particular part of a trade, but it ought to enable him to learn the whole of it.

As I said a moment ago, it is not the expectation that the school alone will turn out skilled journeymen. The skilled journeyman is the product of the school and subsequent shop experience. The two together give him industrial intelligence and skill, — the two things that make him progressively efficient; because he is conversant with all parts of his trade and its underlying sciences, and understands himself and his relation to other workers, and his trade in relation to other trades and to the social whole of which they are parts. His subsequent progress will depend solely on the acquisition of increasing speed and skill, and his power to apply what he has learned.

So much for the boy of sixteen who is ready to begin to learn a trade. As I said a little while ago, there is a large army who go astray, who leave school at fourteen or fifteen, and in the course of the next few years forget what they have learned and learn nothing more; so that many of them when they reach the age of twenty-one are not as well equipped, mentally, as they were when they left the grammar school. Now, to provide an opening for these fellows in the trades, such a school as I have referred to would have to take them in at fourteen or fifteen, when they leave the grammar school, and "try them out," so to speak, up to sixteen; so that by the time they are sixteen it would be possible to ascertain whether they were fitted for any mechanical trade, and it also ought to be possible, under good management, to tell what trade they are fitted for. Of course

in such a school there would be much shop instruction. Such instruction would be parallel to the instruction in manual training in the manual training high schools, but it would be much closer to the trades. It would not be trade instruction, however, but adapted to young pupils.

In such a school, if we provide during the first two years suitable instruction in English, mathematics, chemistry, physics and drawing, and the history of industry and commerce, — if we should provide such a school as that, what would happen? We would, in the first place, deepen and extend the knowledge of the pupils who now leave school when they are fourteen or fifteen, and *all of that education will be pointed in the direction of a trade.* The whole atmosphere of the school, as the result of its special purpose, will tend to direct boys into a trade, and girls, too; for of course, although we talk much about boys, we do not lose sight of the girls. Many girls have to go into some skilled industry, and, like the boys, they are not provided with opportunities for preparing themselves for these skilled industries. These boys and girls, then, having been kept under systematic educational influences from fourteen to sixteen, when they are ready to begin to learn a trade, will not have forgotten what they had learned. They will have extended and improved their knowledge; they will have deepened it; and they will come to the important period of young manhood and young womanhood with a purpose and a training which at present the great majority don't get.

Now, it is sometimes thought that the ordinary school could give this incidental training in physics and chemistry and mathematics, and drawing and history and English, to which I have referred. It is sometimes thought that the ordinary school can do that. The difficulty about that supposition is, that, in the first place, the school has not done it, — that is, it hasn't done it so as to develop in these boys a vocational purpose. The work of the elementary school and of the high school is general education. It is intended to extend the knowledge of the pupils and to develop their mental powers; this education the ordinary school provides, whether elementary school or high school, without reference to the application of what the pupils learn to any particular vocation. Such a school as this commis-

sion has in mind, I take it, is a school which intends to develop from the very beginning the vocational purpose, and intends to shape all of its work in such a way that the vocational purpose will be preserved throughout. That is to say, it would be natural, of course, for every boy who entered such a school as this at fourteen or fifteen, or later, — it would be a natural and proper thing for him to declare his intention to learn a trade; otherwise, his place would be in the high school, and not in such a school as this commission is likely to approve.

In the second place, the value of the so-called academic studies, the mathematics, the trade history, the English, the science, — the value of all that to the prospective trade worker is in the motive, in the purpose with which it is pursued, and in the close relation of the work done in those studies to that purpose. General chemistry or physics, for example, as such, would have comparatively little interest to a pupil going into the metal trades. What the metal worker is particularly interested in is the chemistry or the physics which is appropriate to his particular calling. And when we come to drawing, the drawing which the printer or jeweler uses is a different kind of drawing from that which the machinist needs or that which the carpenter needs. It is clear that the problems to be solved by the printer in his trade, the mathematical problems, the arithmetic say, of his trade, is different from the arithmetic of the machinist or the arithmetic of the carpenter; and it is clear that the geometry that the agriculturist needs is different from the geometry of the machinist and of the carpenter.

The difference, therefore, between instruction in these studies in the ordinary school and in the school which provides education for a trade is clear. It is the business of the general schools to give a general education. It is the business of a school which stands for the development of mechanical skill and for the all-round development of the workman in a trade to shape its work in such a way that everything that is done in that school will help in the direction aimed at. Therefore, I think it is important to make sure that all this academic instruction, which, for convenience, may be called theoretical instruction, that is, — the drawing, the chemistry, the physics, the English, the history, the mathematics, — all that theoretical instruction has its

particular uses for the particular tradesmen. The general instruction of the high school is useful for the boy who doesn't yet know what educational career is ahead of him; or for the boy who has a longer educational career before him, and can wait a long time to find what particular portions of the chemistry, history and the rest are of special value to him.

We want, therefore, to do these things, — we want to train the workman in the shop in such a way that he gets all the processes of his trade, instead of a single process. We want to prevent the development of a narrow tradesman, — a narrow mechanic. We want, so far as the school can do it, to start the development of an all-round tradesman in his craft. The more he knows about his trade and its theoretical foundation, as well as the processes of it, the more likely he is to be the sort of workman we want.

Now, I have sketched as definitely as I could a very indefinite scheme; and I think, perhaps, I have said enough to suggest to you the sort of general plan which the commission has in mind as possible of working out, and as possible of adjustment to local needs. It is clear that this community, for example, will need a school for training for the trades different from that needed by the city of Attleborough, for example, or needed by another city whose industries are totally different from those of this city. Therefore, it is quite impossible to say in advance what the precise nature of such a school would be, until a given community sets forth what its particular needs are, and suggests the development of plans to meet those particular needs. Then the commission can deal specifically with those particular needs as they arise, and either approve, or approve with modifications, or decline to approve, as the case may be, such schemes as may be presented.

I think I have said enough, gentlemen, to start the ball rolling. We shall be glad to get from you your own point of view, and to answer the questions that you may raise if we can. Mr. Morse, our secretary, is a man who is himself skilled in several trades, and knows the work of the trades as most of the rest of us do not; and he reminds me of one very important feature of our plan of which I neglected to speak.

There are a great many men now employed, of ages from eighteen or nineteen to perhaps forty, and even older than that, who feel that they want further instruction; who feel that they need instruction for their own improvement and for the betterment of their chances in the industrial world. Those men, of course, are unable to leave their work in the daytime; consequently, such a school as I have been talking about would provide instruction in the evening for men of that class. We have no doubt that the number of men who would avail themselves of such evening instruction would be considerable. The experience of the two public evening schools of trades in this State, namely, the one at Springfield and the one at Cambridge, and the evening classes of the Y. M. C. A. the country over, and of other philanthropies, shows that there is a widespread demand for that kind of instruction.

While I am on this point I may as well also refer to what some of you may have already availed yourselves of, namely, the correspondence schools. The extraordinary success of these schools is an indication of the earnest desire of many workmen to improve themselves in their several vocations. Such a school as we are planning ought to put at every man's elbow the kind of school that he now tries to get by correspondence; and if any of you have experienced the disadvantages of instruction by correspondence, you know better than I how great they are. They are very great, but such instruction is better than nothing.

As you gentlemen are also aware, this movement is not confined to Massachusetts, though Massachusetts, fortunately, is the first State which has taken steps to secure industrial schools. There has been formed recently a national society for the promotion of industrial education, and this national society is arousing widespread interest and is securing strong support. It is likely to have a decided influence on the development of industrial education throughout the country.

Now, what we are all concerned about is, that this industrial education shall be what it ought to be; that it shall be wise; that it shall be beneficial; that it shall accomplish what we are aiming at; that it shall promote the best interests of the employer and the employee. About a month ago I was in Provi-

dence, and they are moving in Rhode Island toward securing a commission similar to the one which Massachusetts has. About two weeks ago I was in Syracuse, and I found that in New York State they are beginning to move in precisely the direction in which we are moving in Massachusetts. But Massachusetts is in the lead. Naturally we believe that Massachusetts ought to be in the lead, and keep the lead; so that in all our industries we shall turn out the best products and furnish the best conditions for the working man. The two things inevitably go together.

Appendix B.

Introductory Remarks by the Chairman of the Commission at a Conference with Citizens, at Pittsfield, Jan. 24, 1907.[1]

This Commission on Industrial Education, appointed by Governor Guild, is the result of a recommendation made by a previous commission appointed by Governor Douglas. That previous commission was appointed to investigate the industries of the State and the needs of industrial education throughout the State. That they accomplished. They published their report in April of last year, and a very valuable document it is, one of the best educational documents which, I think, has been published in this country for many years. They recommended the passage of a law directing the Governor to appoint a commission to continue investigations into industrial needs and into the methods of industrial education, and particularly to promote the establishment and maintenance of schools for industrial education throughout the Commonwealth; and you see before you this commission, appointed by Governor Guild in accordance with the statute.

Governor Guild's commission was organized in September; and since that time the commission has been busily engaged in acquainting itself with the conditions throughout the State, — with the desires of the people in different localities, and with what could be expected in the near future in the way of schools to respond to the needs which different localities may feel.

I suppose, Mr. Chairman, in response to your invitation that I should take my own method to put before this conference what there is of interest in our minds concerning industrial education, I may, if you please, begin with a somewhat general sketch of the development of Massachusetts, and of the appearance of new educational needs as that development has gone on; and of

[1] Reported stenographically.

the fact that up to the present time those new educational needs have not been met by suitable educational institutions, — that is, by suitable schools.

All of you are aware that reading, writing and arithmetic formed the program of studies, or "course of study," of the colonial school; and that, as the colonies developed, expanded in territory and increased mightily in their occupations and in their various industries, the extent of territory and the growth of their activities brought, among other things, an influx of immigration. Now, these foreigners needed to be assimilated; and for that purpose it was seen that the history of this nation, — how it has come to be what it is, what it stands for, what the ideals of this country are, — it was seen that it was important to teach this to the people coming to this country and expecting to become citizens; and so history became one of the studies in the ordinary school program. So, too, with the extension of territory and the relations which this country came to have with foreign nations it was found that geography was an essential study. Up to that time geography had not received much attention in the common schools of the land; but as soon as our territory began to expand, and we came to have relations with other nations, it was seen that geography was a desirable thing to put into the program of studies. Not long after that people began to gather in cities, and what had once been largely a rural population became largely an urban population, and that is particularly true of Massachusetts. With the development of an urban population there grew up, of course, a new series of educational needs. Boys and girls who had been bred in the country and who had various tasks to perform about the house and the farm had learned to use their hands and to direct their hands by their heads. When people moved into the cities the opportunity for such training was greatly diminished, so that at last that kind of education was largely wanting; sometimes to-day it is wholly wanting. The effect of that is, of course, to make our school education one-sided. The education of the schools was academic, as we sometimes say; that is to say, it was literary, bookish, — did not reach the whole boy or the whole girl. It was a good education for its time, because of the home conditions of the children, whether in the country or in the villages, where our

people then lived largely, or in very small cities; but with the growth of cities the education afforded in the existing schools had become inadequate.

Now, the point I am trying to make is this: the school system of any State is a growth; that it is a growth in response to educational needs as they appear; and that that State has the best educational system which clearly recognizes those needs, and then adjusts its educational institutions, its schools, so as to meet those needs.

Early in the nineteenth century Massachusetts began to be more and more a manufacturing community, — it was no longer a farming community to the extent to which it had been; and this change has continued, until, as you know, Massachusetts is to-day largely dependent for its prosperity, for its very existence, on its industries, on the way in which those industries meet the needs of our people and of other people whom we wish to sell goods to.

And that brings me, of course, to the point of which I wish to speak; namely, the need of supplying the kind of education which would enable us to produce goods which we find satisfactory ourselves and which would enable us to compete in the markets of the world, and at the same time to produce men worthy of Massachusetts and of any part of the world. In other words, the new educational need which has arisen is a school that will train men and workers and citizens. Our present schools are doing excellent work; they are doing all they can do; and they are doing it better than they ever did it before. Some of you may have heard from time to time a complaint that the public schools of to-day are no longer doing the solid work which they did a generation ago. It isn't true. There are some persons, impervious to evidence, who insist that the public schools are not doing as good work to-day as they did a generation ago. Some of you may have heard of an investigation in a town in this State a couple of years ago. That town was Springfield. The superintendent of schools discovered some examination papers of more than a generation ago, — some papers in geography, arithmetic and spelling. Now, those same examination questions were asked of the pupils in the schools to-day; and the results of those examinations were ever so much better than

they were when the same questions were answered a generation or more ago. The same experiment was tried in Boston in a number of schools; it was tried in other towns in Massachusetts; our friends in New York heard of it, and they tried it; in other parts of the country the same experiment has been tried, — and always with similar results. I insist, therefore, that in the matter of arithmetic and spelling and geography we have proved that the schools are doing better work to-day than they did a generation ago.

My point is this: that the public school system is not only doing the work which it did a generation ago, and doing it a great deal better, but it has been obliged, on account of the change in educational needs, to do a great deal more and to do it well. But with all that, and because of it, the existing public schools are no longer able to cope, unaided, with the educational problem which confronts us to-day; this problem, namely, of so training our workers that they will be the best kind of workers which this country can produce, and that at the same time they will develop the conditions which go with increased efficiency, — that is to say, increasing wages and steady employment. I take it that everybody will agree with me that one of the greatest blessings in this world is a steady job and the prospect of an increasing income.

The purpose of industrial education, as I see it, is this: to provide a kind of education for the worker which will benefit him, and at the same time, of course, benefit the employer, — benefit the employer and benefit the workman, and so benefit the society of which they are both parts.

The question arises, of course, first, how this is to be done; in what sort of schools such an education as I am sketching in the roughest outline may be provided.

You are aware that up to the age of fourteen the children are by law obliged to go to school, and under certain conditions they are obliged to go to school until sixteen; but up to fourteen you know that all of them are obliged to go to the ordinary public schools. That is a wise law. Now, after fourteen, if they can remain in school, they may at present go to high school. The high school is an institution for general education; that is to say, it is an institution for an education that does not prepare

for any particular occupation; it is an institution without the vocational aim, without the vocational purpose.

Now, any kind of an institution for industrial education must have a vocational purpose; that is why it exists. It aims to equip the person who follows the course of instruction in that school so that he can realize that vocational purpose; that is, so that he can get himself ready for a vocation, and become progressively useful in it. What I described a little while ago as an opportunity for a steady job and an increasing wage is the result.

The last commission, to which I referred at the outset, showed that there are at this moment in Massachusetts at least twenty-five thousand boys and girls between the ages of fourteen and sixteen who are either idle or at work; and it showed that of that large number a large proportion entered various kinds of juvenile employment, like driving a wagon, running an elevator, being an office boy or an errand boy, or some other kind of juvenile occupation, in which they remain for several years; and when they get to be eighteen or nineteen or twenty years of age their earning capacity is very little more than when they began, because they have not learned something in which they could make progress. The report of the Douglas commission showed also that a large proportion of these boys and girls would have remained in school if there was to be had in that school the preparation for a life occupation which would afford them just the thing I have been talking about, — steady employment and the prospect of a rising wage. Now, the parents are easily determined in this matter by the attitude of the children, and many parents were shown to be in favor of having the children in school. I repeat, the parents desire their children to remain in school. But about the time a youngster is fourteen or fifteen years of age, an inactive life does not appeal to him; moreover, a life in which he is under a kind of control, which doesn't seem to him to prepare him for the work on which he is to enter, doesn't appeal to him; a school whose aim is only general education doesn't appeal and cannot appeal to a large proportion of boys or to a considerable number of girls.

One of the fundamental principles on which our education is based is that there should be equal opportunities for all, —

opportunities for those who can go to college, and also appropriate opportunities for those who cannot go to college. But up to this time the bookish education of the schools has been adequately adapted only to those who can follow a long educational career; we have not yet made adequate provision in our school system for the education of those who must enter on earning their living much earlier.

Another reason — on which I must delay briefly — why these schools for industrial education are important is this: those boys who enter the juvenile occupations at fourteen or fifteen, who remain in them or shift about from one to the other in an aimless fashion, are likely to forget, by the time they enter on full manhood, what schooling they had up to fourteen or fifteen. They are apt to be worse off educationally than they were when they left school; they have not been under systematic educational influence for a number of years; they have had no occasion to apply what learning they have had; and the consequence is that what they had acquired by the time they were fourteen or fifteen years of age is largely dissipated. Many of them are worse off for their experience; that is to say, the habits which they have acquired during that time, — the habit of indolence, the lack of a definite purpose, the failure to found or to look forward to founding a home as well, — all these things work against their being the kind of citizens we want.

Now, foreign nations, especially the continental nations of Europe, recognized this long ago. They have supplied an institution which they call the "continuation school," which requires boys — and girls too, for that matter, but boys especially — to be in school for several years longer after they go to work.

I want to come rapidly to my conclusion, because I don't want to hold you too long with these introductory remarks; but I do want to start the discussion in a way that will enable you to feel, when you go away from here, that the subject has been as thoroughly discussed as it may be discussed in a single evening, with such help as the commission can give.

The question is this: what kind of a school do we want in order to meet this educational need which I have been referring to, — in order to equip these boys who won't stay in the schools, who won't go to the high school, or who drift into all

kinds of juvenile occupations where they are not so much needed, and who at eighteen or nineteen are not able to do the work which they ought to do — or even at twenty or twenty-one — for their own benefit and the benefit of society? What kind of a school do we need to help these boys and girls to such a preparation for a vocation as will, in the first place, give them a vocational purpose; in the second place, enable them to select their vocation; and, in the third place, equip them for their vocation, and at the same time give them such general training as every citizen, every man, ought to have?

Suppose that we establish an industrial school; and, by the way, that is a very different thing from the manual training school. The manual training high school is a very valuable educational institution, but it is again an institution for general education, not for vocational education. The experience of manual training high schools shows us that very few of the graduates go into the industries; they go to some higher institution, to some technical school; and few find their way into the industries; and that is what is to be expected. Manual training is so general that it does not equip for a particular vocation, and is not intended to. It is a means of educating the boy with the processes of construction and with the use of concrete materials; just as chemistry is a means of educating the boy by the use of chemicals and the processes of the chemical laboratory; just as Latin is a means of educating the boy by the means and method of language study; just as history is a means of educating the boy by the materials and the methods of instruction in history. All of that means that in each of those studies there is a certain knowledge not to be got from other studies, and there is a certain development of power which those studies bring that other studies do not. But some boys cannot be educated by book studies alone; and they can be educated by the studies which the manual training school affords. In other words, what I have been saying is this: the manual training high school, however good it may be, is a means of general education, and is very valuable as such; thousands of boys since the manual training schools began have had a high school education who never would have gone to a high school if it were not for the manual training given.

Now, then, to come specifically to what I have been approaching two or three times, what kind of a school would this industrial school be? Whatever it is, it must be a school adapted to the locality where it is found; no other school would answer. In general terms, it would be something like this: —

For the boys from fourteen to sixteen it would be a kind of preparatory school. It would also provide much shop instruction resembling manual training, but this work would be much closer to the trades than the manual training in a manual training high school. It would also teach, of course, physics and chemistry, but the physics and chemistry which underlie the trades. It would teach history, but particularly the history of trade and commerce, particularly the history, commerce and agriculture of Massachusetts. It would teach, of course, mathematics and bookkeeping; every man ought to have a knowledge of bookkeeping, in order to carry on his own affairs satisfactorily. It would also teach, of course, the drawing which would underlie the shop work, and it would teach English. When, after about two years, we have found out whether the boy has what we call mechanical capacity and mechanical dexterity, the right kind of capacity to learn a trade, and possibly what trade, — when we have found that out as well as we can in the first two years, the boy would then begin in our school to learn a specific trade: one of the building trades, one of the machinists' trades, or, in an appropriate community, the jeweler's trade, or what not. From that point on, the education of the boy would be specialized, would closely follow the actual work of his trade. The expectation is also that the boy would learn not only the processes of his trade, the chemistry and the physics which underlie it, the mathematics and drawing that underlie it, — he would learn the history of his trade and its relation to other trades, and he would learn to use the English language so as to express himself easily and correctly on matters of interest to him, and he would also know something of the disinterested pleasure to be derived from good literature. He would get, first of all, that kind of all-round training that would give him a comprehensive and intensive interest in his vocation; that would enable him to understand it as the man who works with his hands only, and not with his head, does not and can-

not understand it. His interest would be akin to that which the professional man has in his occupation, — the engineer in his work, the lawyer in his. Such a school would, however, do more for the pupil than to cultivate his industrial intelligence and mechanical skill. It would increase the significance of his life both within and without the shop, and would tend to make of him an enlightened and progressive American citizen, as well as a superior workman. Such men would be of great use to their fellow workmen, as well as to their employers. Whatever discontent they might feel would be enlightened discontent, — a kind of discontent that a democratic society like ours has always respected.

Who could doubt that such a school as that would turn into the field workers of a much greater ability than the workers we have now? Who can doubt that the employer would be glad of such employees, and that together they would turn out products far superior to those which we make now in many lines, in many directions, in many ways? Some of you know that some of its industries are already leaving Massachusetts. It is pretty clear that if Massachusetts is to hold its own among prosperous communities, and to grow in prosperity so that the workers may always find work and the employers always find opportunities for the profitable investment of their capital, Massachusetts must take the lead in producing the finest and highest grade of goods. Such goods can be produced only by the best workmen, working under the most favorable conditions. Superior workmen and good industrial conditions depend in large part on industrial education. It is the chief means of developing men, workers and citizens, and so adding to the prosperity of the entire State.

Appendix C.

Industrial Continuation Schools of Munich.

Since 1900 the city of Munich has gradually been transforming its "continuation schools" for elementary school graduates (corresponding to our grammar school graduates) into elementary technical schools for apprentices in the trades and in business. The city now maintains forty different kinds of these schools. In 1900, were opened schools for butchers, bakers, shoemakers, chimney-sweeps and barbers; in 1901, for wood turners, glaziers, gardeners, confectioners, wagon makers and blacksmiths, tailors, photographers, interior decorators, painters' materials; in 1902, for hotel and restaurant waiters, coachmen, painters, paper hangers, bookbinders, potters and stove setters, watchmakers, clockmakers, jewelers, goldsmiths and silversmiths; in 1903, for foundrymen, pewterers, coppersmiths, tinsmiths and plumbers, stucco workers and marble cutters, wood carvers, coopers, saddlers and leather workers; and in 1905, for business apprentices, printers and typesetters, lithographers and engravers, building iron and ornamental iron workers, machine makers, mechanics, cabinet makers, masons and stone cutters, carpenters.

The industries represented by these schools are the chief industries of the city of Munich, with one exception, — beer; — for the manufacture of which only higher instruction is given, under other auspices. Munich has half a million inhabitants, and therefore approaches Boston in size. It is not, however, like Boston, a city of great industries and immense business interests, nor is it surrounded by a suburban population like that of Boston. It is a great town rather than a great city, and life there is admirably described by the German word *gemütlich*, — comfortable and companionable.

That, in spite of the absence of great industries and great business enterprise, it nevertheless maintains a unique and wholly admirable system of technical continuation schools, whereby those who must leave school at about thirteen or fourteen years of age are well trained for the several callings on which they enter, is due partly to the general principle universally recognized in Germany, — that efficiency in any calling, from chimney-sweeping to watchmaking, requires special training for that particular calling; but chiefly to the energetic and far-sighted city superintendent of schools (*Stadt Schulrat*), Dr. Kerschensteiner, who saw that the ordinary continuation schools failed to supply a much-needed technical training for beginners in the trades and in business. He also saw that a large part of the education received by the children who had to go to work when only thirteen or fourteen years old was lost for want of further education between that time and early maturity. He also recognized what we see very clearly, — that the ordinary training of the usual continuation schools (corresponding to our evening schools) failed to hold the interest and attention, as well as to meet the pressing needs, of most of those for whom they were intended.

He also recognized the enormous importance of keeping young people between the ages of thirteen and fourteen and seventeen or eighteen under systematic educational influence, for the moral and social welfare of these young people as well as for their technical efficiency. He saw that by combining good general education, good technical education and good education in the rights and duties of citizenship, at an age when citizenship begins to have a real significance to the young, he might expect to exert on them a permanent influence for good, — moral, intellectual and technical.

He wrote a brilliant paper, based on a comprehensive investigation into the existing technical schools of Europe, and both the results of his investigation and the subsequent paper were published. His paper was entitled "The Education of German Youth for Citizenship" (*Staatsbürgerliche Erziehung der Deutschen Jugend*). It was submitted by him in competition for a prize offered by the Royal Academy for the Dis-

semination of Useful Knowledge (*Königliche Akademie der Gemeinnützigen Wissenschaften*), in Erfurt. In this paper he answered the question proposed by the academy: "How can we best train our young men for citizenship during the interval between their graduation from the elementary school and their entrance into the army?" His paper won the prize. Thereupon he urged his city to transform the existing continuation schools (corresponding to our evening elementary schools) into technical continuation schools. His appeal to the authorities of Munich and of the State (Bavaria) was successful, and the present admirable scheme of Munich's *Fachliche Fortbildungsschulen* (technical continuation schools) is the result. These schools are in very many instances not evening schools. As continuation school education is compulsory for three, sometimes four, years in Bavaria for all elementary school graduates, the law requires employers to give their employees the necessary time — six to ten hours a week, depending on the school — to attend the continuation schools. Each pupil is required to attend the continuation school planned for the trade or business in which he has found employment. If a youth is not employed in trade or business, he must attend the old-fashioned continuation schools, of which several still exist.

The whole series of schools is too new to enable them all to be equally efficient, yet it is safe to say that no more promising educational scheme has ever been set on foot anywhere; and the success attending the opening of the first of these schools in 1900 led the city to extend them with constantly increasing success, until now there are forty of them.

The technical instruction in these schools is at present given in most instances by a member of the trade or business concerned. The remainder of the instruction is given by some of the day school teachers, except the instruction in religion, which is given by a Roman Catholic priest, or by a Protestant clergyman, or by a rabbi, each to the people of his faith. This instruction in religion is required by law.

As it happens that many good trade workers and business men cannot teach well, the city is encouraging trained teachers to learn the several trades; it grants them leave of absence for this purpose, and some progress in this direction is being made.

Each school is in charge of a committee responsible to the general school authorities, and special pains are taken to secure the best citizens for these committees, and especially to secure the best representatives from the trade or business for which a school stands, and there are always representatives from the teaching force on each committee. In this way each school tends to serve progressively the general and technical ends for which it exists, and is, of course, in each case kept in close touch with the particular needs of, and the special progress in, the particular trade or business which the school serves.

The following programs give an outline of the work done in two of these schools: —

Continuation School for Business Apprentices.

STUDIES.	Hours per Week.			
	Preparatory Year.	First Year.	Second Year.	Third Year.
Religion,	1	1	1	1
Arithmetic,[1]	2	2	1	1
Bookkeeping,	-	-	1	-
Banking and exchange,	-	-	1	-
Business correspondence, reading,[2]	3	2	1	1
Commercial geography and study of materials.[3]	1	1	1	2
Studies in life and citizenship,[4]	-	1	1	1
Stenography,	-	2	2	-
Writing,	1	1	1	-
Total,	8	10	10	6

[1] All the problems are taken from the actual business in which the pupils of a given group are engaged.

[2] Reading is general, but much of it pertains to business careers and to the particular business in which the pupils are engaged.

[3] The raw materials and also the manufactured products are studied. One group, instead of this, receives instruction in money, banking and finance.

[4] Personal and public hygiene; duties, rights and opportunities of the apprentice; deportment; development of trade; transportation and communication in Germany; trade organizations; capital and labor; chamber of commerce and industrial exchange (*Gewerbe Kammer*); civics, made as concrete as possible.

Continuation School for Carpenters and Cabinet Makers.

STUDIES.	HOURS PER WEEK.		
	WINTER HALF-YEAR.		SUMMER HALF-YEAR.
	Classes I to III.	Class IV.	Classes I to III.
Religion,	1	–	1
Arithmetic and bookkeeping,[1]	1	1	1[2]
Reading and business composition,	1	–	1[2]
Studies in life and citizenship,	1	1	1
Drawing: —			
(*a*) Carpenters,	6	6	–
(*b*) Cabinet makers,	3	6	5
Practical technology:[3] —			
(*a*) Carpenters,	2	–	–
(*b*) Cabinet makers,	2	–	1
Total: —			
(*a*) Carpenters,	12	8	3
(*b*) Cabinet makers,	9	8	9

[1] As before, the work in arithmetic consists of the actual problems of the trade concerned, here of the problem actually to be solved by carpenters and cabinet makers.
[2] Alternately. [3] Study of woods, tools, machines, and their care and uses.

In addition to these programs, the city publishes detailed descriptions of the work done in each school. Some of these continuation schools are provided with a preparatory year, because elementary school pupils are obliged to pass only seven of the eight grades provided for the elementary schools; most pupils who have not taken the voluntary eighth grade are put into the preparatory class of the continuation school.

These programs are given here in outline only; but they may serve to call attention to the important class of schools which they illustrate, and the study of further details cannot fail to be of use to those whose duty it may be to plan similar schools.

The schools described are for boys; but a large technical continuation school for girls, with two divisions, — one for household or domestic training and one for business training, — is already in existence.

Certain conclusions suggest themselves as a result of a study of these schools, namely: —

1. They solve the problem of how to keep under appropriate educational influence during their period of adolescence that great body of youth who are obliged to leave school when only thirteen or fourteen years old.

2. There is in them complete utilization of educational opportunity by the pupils. There is no economic or educational waste. Attendance being compulsory, punctuality and regularity of attendance are assured.

3. The program of studies for each kind of apprentice school is strictly limited in scope to an essential minimum of subject-matter, general and technical; and the nature of this subject-matter is well adapted to the end in view, namely, the extension of the youth's education as an individual and as a citizen, and the foundation of progressive interest and technical skill in his chosen calling.

4. All the teachers, except the shop work or technical teachers, being trained teachers (elementary school teachers), the methods are generally excellent and the results correspondingly good. This is, of course, another reason why there is so little economic and educational waste. Every hour of instruction counts.

5. Only youth already in service are members of these schools.

6. Since representatives of the several trades and businesses are on the governing board of the several schools, the technical work should be, and probably is, determined by the actual contemporary needs of the several vocations represented by the schools.

7. The schools embody a well-defined policy that underlies all forms of activity in Germany; namely, that every efficient worker, whether in trade, business or profession, requires general education, and also technical preparation, for the particular work he is to do.

Appendix D.

Industrial Continuation Schools for Jewelers' and Gold and Silver Workers' Apprentices.

1. *Origin of the School.* — The jewelers and gold and silver workers of Munich are divided into two groups, of which one pursues the business of actually manufacturing, and the other that of the dealer. While many master workmen of the first group have one or more apprentices, as a rule, the members of the second group do not have any. The number of apprentices at the present time, however, is never less than 60. The number of independent manufacturers is about 80, of which the great majority, probably 60, are included in the "Association of Jewelers and Gold and Silver Workers." There are about 100 helpers in the trade. In spite of the long-felt necessity for a school of their own for the special technical training of apprentices, it had not been possible for the trade to establish such a school, on account of the existing conditions.

On July 28, 1902, on the invitation of the city school superintendent, Dr. Kerschensteiner, there met in his office two representatives of the above-mentioned association (and others), who declared themselves in full sympathy with the intended opening of a trade school for apprentices of jewelers and gold and silver workers, and as a result of their deliberations the following plan for the organization of the new school was outlined.

2. *Plans for the New Organization.* — The plan of the school is provisionally as follows: —

(*a*) In accordance with the four years' duration of the course, the trade school for apprentices of jewelers and gold and silver workers embraces four progressing annual classes, with the same annual period of instruction as in the general continuation school.

(*b*) Attendance is obligatory on the first three classes, in which, in addition to the trade instruction, the general instruction of the pupil is continued; attendance is at present voluntary on the fourth class, in which a higher technical, and as far as possible artistic, education of the apprentice is attempted. For the instruction in these courses, which is to take place in the building of the City Industrial School, the services of instructors can be obtained; its introduction is to be carried out just as soon as conditions and the fitting out of the school make this possible.

(*c*) The instruction is to be imparted in closest possible touch with the industry, and covers the following subjects: religion; industrial arithmetic, with text-book guidance; business composition and reading; studies of life and citizenship; materials; drawing (designing), modeling, chasing and engraving. Later it is intended to introduce into the instruction of the fourth class voluntary practical instruction in enameling and stone cutting. Moreover, in the development of drawing, so necessary in the trades, the voluntary attendants of the school are offered the opportunity to participate in the instruction of the City Industrial School.

(*d*) The instruction extends through 9 hours a week in the first three classes, and 8 hours a week in the voluntary fourth class. Of the 9 hours of the required classes, 6 hours come on two working days and 3 hours on Sunday, from 9 to 12 A.M. Of the 8 hours a week of the fourth class, 3 hours come likewise on a working day, from 9 to 12 A.M., the remaining 5 hours provisionally on Sunday; this 5-hour Sunday instruction will, in the summer months, be reduced to 3 hours of instruction, from 9 to 12 A.M. In consideration of the considerable increase in the business of the industry during the Christmas season, in the month of December the instruction on the working day is given up.

(*e*) The distribution of the hours per week for the individual classes and the four years of instruction are given in the accompanying table: —

SUBJECTS.	Hours of Instruction.			
	Class I.	Class II.	Class III.	Class IV.
Religion,	1	1	1	-
Practical arithmetic and bookkeeping,	1	1	1	-
Business composition and reading,	1	1	1	-
Studies of life and citizenship,	1	1	1	-
Materials,	2	1	-	-
Drawing,	3	4	3	-
Modeling,	-	-	2	3
Chasing and engraving,	-	-	-	5
Total,	9	9	9	8

(*f*) The instruction in materials, in so far as it pertains to metallurgy (chemistry of metals), is imparted by a chemist; in so far as it pertains to precious stones, by a mineralogist; the instruction in modeling, chasing and engraving, by a skilled workman in those lines, — when possible, by a qualified master of the industry; the remaining instruction by members of the teaching forces of the common, continuation and industrial schools of Munich.

(*g*) The expense of imparting the instruction is borne by the city, which likewise provides for the necessary place for instruction.

(*h*) To obtain a collection of materials which shall meet the needs of the school, the Association of Jewelers and Gold and Silver Workers will take the necessary steps; and, further, it will place at the disposal of the school, for the purchase of the necessary materials for instruction, the sum of 100 marks annually. The committee of the industrial continuation school will take upon itself the presenting of the request of the association for appropriations for the trade schools to the proper officials, members of the cabinet, supervisors of manual workers, etc.

(*i*) In the cases of apprentices who, during the three years of required trade study, have not done well, the masters of the association may require the repetition of the whole or a part of the instruction of a class, or make obligatory the attendance on

the fourth-year instruction. Voluntary attendance on a class or course is permitted to those who have completed the required school attendance, and to helpers.

(*j*) For all those who attend the schools, but are not required to do so by law, a nominal fee must be paid to the City Industrial School, as authorized by law, according to the rules for school fees.

3. *Subjects of Instruction.* — The subjects of instruction are selected and arranged as follows: —

(*a*) *Accounting and Bookkeeping.* — The instruction in accounting shall initiate the pupil into the necessary comprehension of a correct conduction of the accounts of the citizen and of business; it must seek to arouse the sense of economy, and lead the apprentice to a satisfactory dexterity in mercantile calculations of prices and values in his industry. It is therefore divided as follows: —

Class I. — *General Accounting:* Service of the gold and silver worker according to hours, days, weeks, months. Wage book. Casting up accounts for the months and year. Workers' and masters' pay; expenditures for work shop and store house; for material and working tools, and other outlays of capital. The daily, weekly, monthly, and annual expenditures of an individual; of a family; housekeeping book; monthly and annual balancing. Savings and their interest. *Business Accounting:* Small purchases; rebate for cash payments; transportation; other business expenses; calculations of weight, and simple alligation.

Class II. — *Business Arithmetic:* More extensive buying and selling calculations; profit and loss calculations; trade calculations; importation; foreign moneys; commercial paper calculations; instalments; sharing calculations; continuation of calculations of weights in the application of specific weight, and also the special weights for gold and jewels, especially practice in their fractional calculations; more difficult calculations of values and mixtures; temperature calculations for the conditions of melting.

Class III. — *Business Accounting; Bookkeeping and Exchange:* The business books of simple bookkeeping (inventory, day, cash, and ledger books); their monthly and annual closing;

adjusting and balancing them; liquidations. Bills of exchange, their kinds and use; bill book. In connection with bookkeeping, simple calculations of cost and of buying propositions, with special consideration of changes in price, and loss accounts; calculation for repairs, singly and in quantities; average and per cent. calculations in connection with these. Problems in assessment and workers' insurance.

(*b*) *Business Composition and Reading.* — The instruction in composition must train the pupil to prepare with correctness all important written papers of private and business intercourse, as regards form, expression and correct writing.

Class I. — *Private Correspondence:* Letters to members of the apprentice's family, relatives and friends, especially about the work of the apprentice, or making use of appropriate matter from other instruction; questions and information; tendering of services; application for a position; public notices; arrangements for instruction. Business recommendations; general writing.

Class II. — *Compositions concerning Conditions of Buying and Work:* Bids for wares; questions as to price; order letters; purchase and work contracts; directions for delivery; bills, receipts; credit references; arrangements for payments; complaints, excuses, judgments, depositions. (Especial attention to use of the higher titles in the business letters of the trade.)

Class III. — *Compositions dealing with Debts:* Debt and security bills; dunning letters; granting of delay; letters to accompany part payment; neglected bills. *Business Correspondence with Officials:* Appeals to the magistrate, police, finance department, other state offices and art institute. Making out of reports to the department of trade and industry, or to the officials in charge of the economic and social matters of the local industry.

The instruction in reading, in connection with citizenship, has for its object the advancement of the ethical and general education of the pupil, and the awakening within him of pleasure and taste in good literature. It also serves, through the use of suitable reading material, as far as such material is present in

reading books, for the advancement of trade instruction. The selection of the suitable pieces for reading is in all classes left to the teachers.

(*c*) *Studies of Life and Citizenship.* — This instruction will supply to the pupil the recognition of the necessity of a reasonable conduct of life. He takes up on the one hand the problems of hygiene, and on the other hand the questions of living which result from his duties to his vocation, the community and the state, in order that he may obtain a clear insight into the necessarily close connection of the interests of all classes of people and trade groups.

Class I. — *Hygiene:* The structure of the human body. Breathing, nourishment and circulation of the blood, — means of subsistence and enjoyment according to their value and worthlessness; the care of the skin and teeth; dwelling and clothing; work and recreation; the harmful influences of the trade; maintenance of cleanliness. *Deportment:* Conduct at home; in school; on the street; in society; toward teachers and helpers.

Class II. — *Industrialism:* History of hand work in general; the development of the gold and silver smith industry in particular; the accomplishments of the ancient eastern peoples in this field, and their progress in the art up to the present time, especially that of the East Indians, Japanese and Chinese; the metal work and ornaments of the ancient Romans; the development of the industry among the people of the north, and especially in the development of the ecclesiastical art work of the middle ages (enamel and filigree work). The influence of Italy in the Renaissance under Cellini. The German masters of that time (Jamnitzer, Eisenhoit and others). The importance of France in this field since the eighteenth century. The present condition of the industry, and the more recent advances (Tiffany, Lalique). Important places of manufacture of the past and present. Related industries. The present-day division of the work, — the most important, from the industrial point of view. Journeyman's and master's examination. (As being closely connected with the industrial instruction, the pupil is introduced to the chief features of the characteristic forms of the productions of his industry.)

Class III. — *Citizenship:* The communal condition. The problems of communal groups; their social and economic arrangements. Rights and duties of communal citizens; communal titular officials. The constitution of Bavaria. Problems of state federation. Duties and rights of citizens of the state. State titular officials. The Bavarian state government. The system of government of the German Empire. The problems of the Empire. Social legisation. Trade and commerce in the nineteenth century, and their significance for the well-being of the citizen and the industrialist.

(*d*) *Materials.* — This instruction is intended to familiarize the pupil with the working tools and materials of his industry, with their qualities, sources of supply and manufacture. It embraces the following subjects, for the first two classes: —

Class I. — *Metals:* The precious and common metals (gold, silver, platinum, mercury, copper, tin, zinc), and their alloys, which enter into the industry. The determination of fineness, and its testing. The smelting and casting of metals. Soldering and the soldering appliances. The separation of metals; the different processes. The use made of gilding and metal waste. The treatment of the surfaces of metals. The coloring through alloying and through corrosion with acids (yellow and white blanching, burning), oxidation, polishing and dulling. Coatings, especially gold plating and silver plating, by galvanic means (arrangement of the proper batteries), through treatment by fire, through rubbing on, and other processes. Metal plating or double process, Talmi wares. The work of etching, Niello work and damasked work. The most important facts regarding the nature of enamel and its application. Making a receipt book for the alloying, coloring and etching (through acid treatment) of metals.

Class II. — *Precious Stones:* The really precious stones, — diamond, ruby, sapphire, emerald, the precious opal; the semi-precious stones, — topaz, amethyst, turquoise, garnet, chrysolite, Armenian stone, agate, jaspar, onyx and others. Identification, peculiarities, polishing and setting of stones. Imitations; reconstructed precious stones; false precious stones (paste, glass diamonds, etc.). Pearls, corals, and their use as ornaments.

(*e*) *Drawing.* — The instruction in drawing in this industry is to educate the eye and the mind of the pupil to the clearest possible grasp of good forms and color effects, and so to form his taste, as well as to make keen and mature the appreciation of the æsthetic problems of his calling. For the accomplishment of this end there are on the one hand the discussion and copying of appropriate works of art of ancient and recent times, and on the other hand the practice in drawing from nature, to show the application of natural forms to the industry of the pupil. The instruction, which for the most part is devoted to free-hand drawing, includes therefore the most varied and rapid, even if simple, sketches and water colors. The work of the three required classes is divided as follows: —

Class I. — Drawing of simple objects of the industry, such as rings, brooches, medallions, ear ornaments, chains, belt clasps, clasps, hair combs, bracelets, book and similar garnishments, simple shell forms, etc., from actual patterns, and also from good representations, such as photographs, heliotype or other artificially prepared drawing patterns.

Class II. — In addition to the instruction concerning the styles in the industry, a series of typical objects from different epochs, using as far as possible the different public collections of the state or city, or such good casts and reprints of valuable old objects as may be accessible. More difficult drawings of richer objects, such as hangings of different kinds, chests, picture frames, lamps, brackets, coats of arms, scrolls, clock stands, cups, bowls, tankard forms, inkstands, table accessories, etc.

Class III. — Sketching from nature of simple and more difficult plant forms, — leaves, branches, buds and fruits, and their artistic application, under direction, to simple composition of natural forms in the work of this industry. The fashioning of ornaments, as far as possible unaided; exercises in the ornamental filling of a given space. Continuation of the exercises in styles with the extension of the drawing subject matter, to include simple forms of animal life and the human body.

(*f*) *Modeling.* — The course in modeling is for the purpose of instructing the pupil in the forms of the different objects of

his industry, and to give him guidance for the reproduction of modeled forms. The exercises are carried on in wax or plastilina, and later in metal, and come in the third and fourth school years.

Class III. — Modeling of simple objects pertaining to this industry according to given patterns, with the truest possible copying of their technical details, and also in connection with the instruction in drawing of modeled and natural forms. In connection with this, the copying of parts of plants, at first in the natural size and then on diminished scale, and their adaptation to current styles of objects of the industry. Making of the castings from the prepared plastilina or wax models.

Class IV. — The extension of the preceding to increasingly difficult modeling. The copying of the richer artistic industrial products of the trade from museum or art collections; making of copies of originals in metals from the finished model forms.

(*g*) *Chasing and Engraving.* — This instruction must plainly be the practical application of the teaching in modeling, to instruct the pupil in the most essential and most necessary processes of the engravers' art, and to offer him the opportunity to make with his own hands some articles of the industry. It comes entirely in the year of voluntary instruction, and takes up the following matters: doing simple, and at first flat, forms; then instruction in the production of round hollow objects by means of stamping; the making of cut out and free wrought ornamental forms; chasing of metal casting (using the models for casting prepared in the instruction in modeling); application of the various final technical treatments (gilding, silvering, oxidation, coloring, etching, etc.) to the objects already made; condemnation of ornamentation in imitation stones; engraving near stones, — the cutting; engraving of easy ornaments; engraving of writing.

(*h*) *Religion.* — The same matter as in the general continuation school, according to the requirements prescribed by the archbishop or of the Protestant higher consistory.

Hours of Instruction. — In the distribution of the hours of instruction, arrangements were made such that in the first year of the existence of the school all the pupils could receive instruc-

tion in metallurgy and precious stones, and all three classes be instructed together. As a result of this, the following weekly schedule was adopted: —

Lesson Days.	Time.	Class I.	Classes II. and III.
Tuesday, . .	9-10	Metallurgy.	Metallurgy.
	10-11	Precious stones.	Precious stones.
	11-12	Religion.	Religion.
Thursday, . .	9-12	- -	Drawing or modeling.
Friday, . . .	9-12	Drawing.	- -
Sunday, . . .	9-10	Practical arithmetic.	Practical arithmetic and bookkeeping.
	10-11	Business composition and reading.	Business composition and reading.
	11-12	Studies in life and citizenship.	Studies in life and citizenship.

Statistical Remarks. — In the school year 1902-03, the pupils of the school numbered 49 apprentices, who were required by law to attend the continuation school. Enumerated according to their religious beliefs, there were 40 Catholics, 8 Protestants and 1 Hebrew. Of the 49 pupils, 36 had their homes in Munich, 1 in upper Bavaria (outside of Munich, however) and 9 in other parts of Bavaria, 1 in another German state, and 2 were foreigners. The parents of the pupils were of the following classes: 19, industrial work; 8, mercantile life; 19, official and service work; 3, unskilled wage workers.

Appendix E.

Leading Manufactures in Massachusetts.

[Compiled from statistics of the Massachusetts Bureau of Statistics of Labor, 1906.]

Name.	Number of Firms.	Capital invested.	Value of Goods made.	Employees.	Average Yearly Earnings.	Schools preparing for Industry.
Boots and shoes,	642	$54,105,342	$178,492,136	69,900	$530	-
Cotton goods,	163	171,190,902	142,935,223	95,372	361	3
Woolen goods,	151	44,176,605	60,048,155	25,734	432	3
Worsted goods,	41	39,647,783	58,455,252	20,478	407	3
Food preparations,	362	31,182,879	81,254,601	12,904	428	-
Machines and machinery.	374	64,989,121	54,419,727	30,933	572	3
Metals and metallic goods.	437	39,387,497	55,583,537	24,986	559	-
Rubber and elastic goods.	48	23,900,316	54,229,847	12,826	470	-
Leather and leather goods.	142	26,567,446	41,427,106	9,634	964	-
Clothing,	264	14,868,549	34,474,292	15,077	396	-
Paper and paper goods,	124	48,830,031	33,178,328 10,401,728	11,780 4,420	473 423	- -
Print works, etc.,	45	28,237,116	32,739,880	7,380	441	-
Electrical apparatus and appliances.	45	11,556,968	18,372,598	9,613	577	3
Furniture,	169	15,118,247	16,258,311	8,368	492	-
Jewelry,	109	8,388,173	12,287,979	6,239	536	-
Printing and bookbinding.	70	8,701,363	10,939,934	5,618	566	-

Appendix F.

Courses of Study.

The following outlines of courses of study are taken from catalogues of schools, and are submitted as suggestions only, to local committees who are formulating programs: —

1. PRATT INSTITUTE, BROOKLYN, N. Y.

Department of Science and Technology.

Day Courses.

Carpentry and building, one year; machine construction, one year; steam and machine design, two years; applied electricity, two years; applied chemistry, two years.

Fees, $15 per term; three terms per year.

Evening Courses.

Three evenings a week between September 26 and March 22; hours 7.30 to 9.30.

Technical: —		
Practical mathematics,	Two seasons,	$10 per season.
Elementary electricity and mechanics,	One season,	Two lectures and four hours' laboratory work each week.
Chemistry, (Fourth and fifth seasons for advanced work in organic chemistry, assaying, electrochemical and industrial chemistry.)	Three seasons,	Lectures and laboratory.
Applied electricity,	One season,	Lectures and laboratory.
Mechanical drawing and machine design,	Two seasons,	– –
Mechanism,	One season,	Lectures and drawing.
Steam and steam engine,	One season,	Lectures and laboratory.
Strength of materials,	One season,	Lectures and laboratory.
Trade: —		
Machine shop practice,	Eight lectures,	$1 for course.
Carpentry and building,	Two seasons,	Talks and shop work.
Pattern making,	Two seasons,	Talks and shop work.
Plumbing,	Two seasons,	Lectures and practice.
Sign painting,	Two seasons,	– –
Fresco painting,	Two seasons,	– –
Machine work and tool making,	Three seasons,	– –

Where not otherwise marked, the fees for the evening courses are $15 per season of six months.

Carpentry and Building (Day Courses). — One-year course, to prepare young men for carpenters, builders, or foremen in planing mills or building operations.

Periods per week: —

Lectures and practical talks, shop practice at the bench and with machinery,	24
Mechanical and architectural drawing,	6
Mathematics,	5
Plans and specifications,	1

Tuition, $15 per term; three terms a year.

Machine Construction (Day Courses). — One-year course, to prepare young men for positions as foremen in machine shops.

Periods per week: —

Machine construction,	18
Tool making,	8
Mechanical drawing,	6
Mathematics,	5
Moulding and pattern making, forging,	3

Tuition, $15 per term; three terms a year.

Steam and Machine Design (Day Courses). — Two-year course, to prepare young men as designers or master mechanics for building machine tools, steam engines, etc., or becoming assistant engineers in power plants.

SUBJECTS.	Periods per Week.	
	First Year.	Second Year.
Mathematics : —		
Algebra, geometry, trigonometry,	5	5
Physics and laboratory : —		
Mechanics, heat and electricity,	11	–
Mechanism and mechanics : —		
Strength of materials, steam engine and transmitting power,	–	5
Drawing : —		
Mechanical,	8	–
Machine sketching,	1	–
Machine design,	–	10
Shop work : —		
Carpentry, pattern making, foundry, forging,	10	–
Machine work, machine construction, tool making,	–	10
Laboratory : —		
Strength of materials, steam laboratory,	–	8

Tuition, $15 per term; three terms a year.

Applied Electricity (Day Courses). — Two-year course, to prepare electricians and operators, or managers in electric lighting stations or railway or power plants.

SUBJECTS.	Periods per Week.	
	First Year.	Second Year.
Mathematics : —		
Algebra, geometry, trigonometry,	5	–
Advanced algebra, solid geometry, analytical geometry,	–	5
Physics, 5 ; laboratory, 6 : —		
Mechanics, heat, magnetism, electricity,	11	–
Chemistry, 3 ; laboratory, 4,	7	–
Applied electricity, 4 ; laboratory, 8,	–	12
Mechanism : —		
Strength of materials, steam engine and boilers,	–	3
Drawing, mechanical : —		
Projections, shop, engine details,	6	–
Dynamo details : —		
Switchboard and wiring, power plants,	–	8
Shop work : —		
Carpentry, pattern making, foundry, forging,	6	–
Vise work, machine work, mechanic construction,	–	6

Tuition, $15 per term; three terms a year.

Applied Chemistry (Day Courses). — Two-year course, to prepare young men for positions as foremen or superintendents in chemical manufacturing plants.

SUBJECTS.	Periods per Week.	
	First Year.	Second Year.
Chemistry, 5 ; laboratory, 8,	13	–
Chemistry, 5 ; laboratory, 12,	–	17
Mathematics,	5	5
Physics and laboratory,	7	–
Mechanical drawing,	4	–
Machine design,	–	6
Shop work : —		
Carpentry, pattern making, forging, foundry,	6	–
Applied mechanics,	–	3
Mechanical laboratory,	–	4

Tuition, $15 per term; three terms a year.

2. CALIFORNIA SCHOOL OF MECHANICAL ARTS, SAN FRANCISCO, CAL.

MANUAL TRAINING COURSE.

	PERIODS PER WEEK, FORTY WEEKS TO THE YEAR.			
	First Year.	Second Year.	Part of Third Year.	Average.
For boys : —				
Academic studies,	17½	17½	10	15
Mechanic arts,	15	17½	10	14⅛
Carpentry, moulding, pattern making,	10	–	–	–
Drawing, free and mechanical,	5	–	–	–
Forge work and moulding,	–	10	–	–
Drawing, free and mechanical,	–	7½	–	–
Modeling or wood carving, — optional,	–	–	–	–
Machine shop,	–	–	10	–
For girls : —				
Academic studies,	17½	17½	5	–
Mechanical arts : —				
Sewing,	7½	–	–	–
Drawing, free and mechanical,	5	5	–	–
Dressmaking and millinery,	–	10	–	–
Cookery,	–	–	10	–
Household arts,	–	–	5	–
Modeling or wood carving, last two years, — optional,	–	–	–	–

Attendance is from 9 A.M. to 3.30 P.M. the first two years, and 9 A.M. to 4.20 P.M. the last two years.

At the beginning of the third year the students choose one of the following eleven mechanical and industrial courses, and take a two-years apprenticeship. The preliminary course is gradually merged into the technical course during the first six months of the third year.

Trade and Technical Courses for Boys.	Supplemental Instruction.	
Pattern making, including gear wheels, steam engines, propeller blades, dynamo frames, etc.	Advanced foundry work; methods of manufacturing and seasoning lumber; shop methods with wood-working machinery; mill methods.	Science and mathematics; mechanical drawing.
Forge work, engine shafts, cranes, lathe tools, wagon parts, structural and ornamental iron work, etc.	Estimates, contracts, specifications; prices, sources and proportion of materials; metallurgy of iron; production of steel; manufacture and use of rolled steel.	Science and mathematics; excursions (Saturdays) to iron-working establishments.
Machine shop practice: use of lathe, planer, shaper, drill, milling machine, etc.; construction of engines, lathes, pumps, gas engines, etc.; electrical construction, dynamos, motors, hoists, heating and lighting appliances, etc.; care of power plant.	Estimates, contracts, specifications; prices, sources and properties of materials; metallurgy of iron; production of steel.	Science and mathematics; excursions (Saturdays) to iron-working establishments.
Mechanical drafting,	– –	– –
Ship drawing,	Estimates, contracts and specifications; metallurgy of iron; production of steel.	Science and mathematics; excursions(Saturdays).
Industrial chemistry,	– –	Science and mathematics; excursions(Saturdays).
Industrial art,	Chemistry of materials, their proportions, preparation, etc.	History of art; excursions to museums, art exhibitions, etc.
Course to prepare for university course in engineering, civil, mechanical, electrical or mining.	– –	– –
Polytechnic course, made up of elective subjects, to round out a four-year course, such as given in manual training high schools.	– –	– –

Trade and Technical Courses for Girls.	Supplemental Instruction.	
Cookery (advanced): canning, preserving, desserts, cooking for invalids, etc.	Preparation of menus; table decorations.	Physiological principles and nutritive values.
Dressmaking: designing and making tea-gowns, princess dresses, tailor-finished suits, etc.	Study of drapery, sketching; methods of manufacturing threads, cloth, etc.	History of costume; hygienic principles; excursions to manufactories.
Millinery (advanced): covering hats, crepe bonnets, velvet hats; trimming with choice materials; manufacture of frames and braids.	Study of effects, sketching; methods of manufacturing materials.	History of costume.

About seventy-five per cent. of students' time is devoted to technical instruction, the rest to supplemental instruction. All apprentices are required to meet one hour a week, in a body or in sections, to discuss papers and reports by individuals. The subjects are selected and assigned by the students themselves, and relate to manufacturing processes, history of industry, etc. Each topic is placed before the class by means of printed abstracts and the stereopticon.

Each student pays $10 a year to cover materials, and about $2,500 a year is derived from sale of articles manufactured in the school.

Enrollment, 372, United States Labor Commissioner's Report, 1902.

All trade students get a brief course in political economy, commercial geography, history and government of the United States.

The instruction in science and mathematics is different in the different apprentice courses.

Nearly all trade students take one or more of the following: Theoretical mechanics; strength of materials, including laboratory practice and tests; graphical statics; boiler and engine tests; dynamo tests; heat calculations, including study of transformation of energy; hydrostatics; laws of gases; metallurgy of iron; bookkeeping and business forms.

3. WILLIAMSON FREE SCHOOL OF MECHANICAL TRADES, WILLIAMSON SCHOOL, P. O., PA.

Scientific and Practical Courses in Building and Mechanical Trades.

Three-year day course, eleven months in each year.

The apprentices take one of the following courses: carpentry, pattern making, bricklaying, steamfitting and electrical and steam engineering, machine trade.

Academic branches: reading, writing, language, arithmetic, algebra, geometry, trigonometry, physical and political geography, history,

physical science, civil government, English literature, physiology and hygiene, elementary vocal music, chemistry, theory of the steam engine, strength of materials and building construction.

The schools and shops are in session eight hours a day on five days of the week, and three hours on Saturday.

Each pupil takes four hours a day in the class rooms and four hours in the shops the first year, the proportion spent in the shops gradually increasing toward the end of the course.

Conditions of admission: elements of an English education (about a fair grammar grade); able-bodied, intelligent and healthy.

Indentured for three years.

4. BARON DE HIRSCH TRADE SCHOOL, NEW YORK CITY.

Trade Courses, Theory and Practice, Day Classes.

Carpentry, machinery, plumbing, painting, electricity.

Two terms a year, five and one-half months each.

Conditions of admission: the applicant must be sixteen years old, able-bodied, and a Jew. Probation, fourteen days; if satisfactory, candidate is enrolled as a regular pupil.

Instruction free.

The increase in efficiency and earning power resulting from these short courses is marvellous.

5. TUSKEGEE INDUSTRIAL INSTITUTE, TUSKEGEE, ALA.

Four-year Academic Course, with Two and Three Year Trade Courses.

Trade courses: instruction and training in thirty-six trades.

Agricultural courses, two years theoretic and practical: agriculture; horticulture; market gardening; floriculture and landscape gardening; botany; agricultural chemistry; entomology, bacteriology, vegetable physiology and pathology; dairying; live stock raising; poultry raising; bee culture.

Drawing: freehand, with color work, three years; mechanical and architectural, with study of building materials, estimates, specifications, etc.

Mechanical courses: carpentry, three years; blacksmithing, two years; wheelwrighting and carriage building, three years; carriage trimming, three years; harness making, two years; painting, two years; machinery; plumbing; founding; printing, three years; shoemaking, two years; bricklaying and plastering, two years; brickmaking; sawmilling; tinsmithing, two years; tailoring, four years.

Girls' courses (all the agricultural courses are adapted to girls): plain sewing, two years; dressmaking, three years; millinery, two courses of four months each; tailoring, four years; laundering, three terms; mattress making and upholstery; cooking, two years; canning; housekeeping; nurse training, three years.

6. BOSTON TRADE SCHOOL FOR GIRLS.

Courses of Study.

Average length of the course, one year. Length of day, 8.30 A.M. to 5 P.M.

In the trade work the pupils work with expert trade teachers, as in a shop, with this difference, — that there is no division of labor, so that each pupil learns the various processes.

Dressmaking Department.

First half year: —

I. Plain sewing: children's clothing, twelve weeks; underwear, twelve weeks; (foot and electric power machines), — twenty-five hours.
II. Design, three hours.
III. Hygiene and gymnastics, two and one-half hours.
IV. Domestic science, two hours.
V. Arithmetic, textiles, and discussion of business problems, two and one-half hours.

Second half year: —

I. Dressmaking: shirt-waist dresses, twelve weeks; fancy gowns, twelve weeks, — twenty-five hours.
II.–V. As above.

Millinery Department.

First half year: —

I. Plain sewing, twelve weeks; millinery (introductory), twelve weeks, — twenty-five hours.
II.–V. As above.

Second half year: —

I. Millinery: spring hats, twelve weeks; winter hats, twelve weeks, — twenty-five hours.
II.–V. As above.

Machine Operating.

First and second half years: —

I. Machine operating: aprons, underwear, curtains, shirt-waists and other garments, special machines, tucking, button-holing, etc., — twenty-five hours.
II.–V. As above.

Straw Hat Making.

First and second half years: —

I. Machine operating: clothing, twelve weeks; hats, thirty-six weeks, — twenty-five hours.
II.–V. As above.

7. MASSACHUSETTS CHARITABLE MECHANIC ASSOCIATION TRADE SCHOOL, BOSTON.

Requirements for admission: good moral character; seventeen to twenty-four years of age; ability to read and write.

Tuition fee: entire term, $12 (in advance). Tools and materials supplied by school. Drawing can be taken without extra charge.

All courses require three terms (three years) for completion, with the exception of plumbing, which may be completed in two terms. Each term comprises seventy evenings.

Masonry: bricklaying, tile setting.

Carpentry: practical; theoretical; boat making.

Sheet metal working: pattern drawing and cutting.

Electricity: bell wiring; wiring gas fixtures, incandescent and arc lamps; construction and care of dynamos and motors; transformers; switchboard wiring; telephone-cable work; joint wiping; care of storage batteries.

House painting (instruction in frescoing and sign painting will be given whenever the demand for such instruction becomes apparent): care and use of tools; rules of health; mixing colors; painting fresh wood, brick and plaster surfaces; graining; glazing and kalsomining; lectures on materials used in trade, and on the elements of the science of light, color and design.

Plumbing: practical; theoretical.

Drawing: use of ordinary drawing instruments; simple mechanical drawing; freehand drawing.